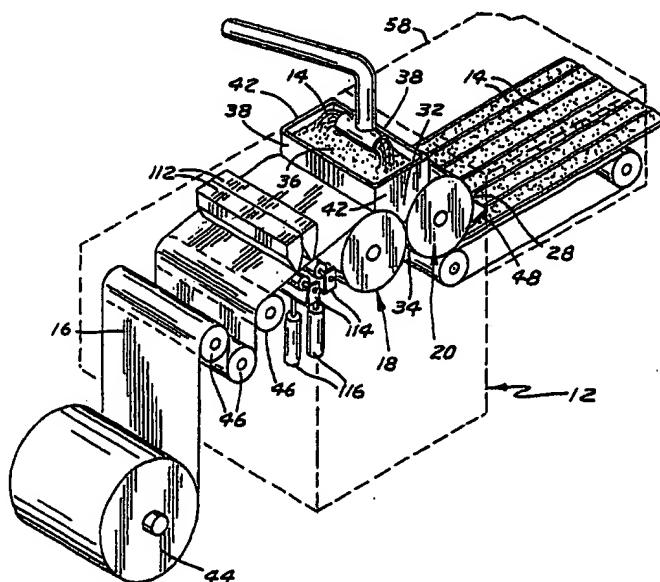


PCTWORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : A23L 1/22, A23P 1/08	A1	(11) International Publication Number: WO 00/08954 (43) International Publication Date: 24 February 2000 (24.02.00)
<p>(21) International Application Number: PCT/US99/14222</p> <p>(22) International Filing Date: 22 June 1999 (22.06.99)</p> <p>(30) Priority Data: 09/132,721 12 August 1998 (12.08.98) US</p> <p>(71) Applicant (for all designated States except US): GENERAL MILLS, INC. [US/US]; Number One General Mills Boulevard, P.O. Box 1113, Minneapolis, MN 55440 (US).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): GORDON, Daniel, L. [US/US]; 12840 54th Avenue North, Plymouth, MN 55442 (US). NORDLING, Paul, D. [US/US]; 6716 110th Avenue North, Champlin, MN 55316 (US). ROY, Soumya [IN/US]; 4910 Olive Lane North, Plymouth, MN 55446 (US).</p> <p>(74) Agents: O'TOOLE, John, A. et al.; General Mills, Inc., Number One General Mills Boulevard, P.O. Box 1113, Minneapolis, MN 55440 (US).</p>	<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report.</p>	

(54) Title: FOOD ITEM AND ITS FABRICATING METHODS



(57) Abstract

Topical applications are provided to the support material (16) before the deposit of the food (14) thereon or to the food (14) after the deposit of the food (14) on the support material (16). Thus, although the food (14) is continuously deposited on the support material (16), the characteristics of the food is varied by contact with the topical application. In the preferred form, the topical applications are in the form of flavors, colorants and/or fortification ingredients and especially temperature sensitive ingredients.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

-1-

1 Food Item and its Fabricating Methods

BACKGROUND

The present invention generally relates to apparatus and methods for fabricating food items, particularly to
5 apparatus and methods for fabricating food items including food supported on support material, and more particularly to apparatus and methods for fabricating a coil of food supported on support material.

The sale of snack-type food products is a highly
10 competitive business. In addition to the particular food components, increasingly the novelty and play value of the product are important in the marketability of any particular food item. For example, many foods such as dehydrated fruit puree are formed in a strip of a thinness
15 generally requiring external support. One manner for increasing the novelty and play value of such foods is to roll the support material and the food supported thereon into a coil creating a novelty form of merchandizing for that food. Particularly, fruit-based snack products such as
20 FRUIT ROLL-UPS™ fruit products have found wide market acceptance. Likewise, FRUIT-BY-THE-FOOT™ fruit-based snack products such as the type disclosed in U.S. Patent Nos. 5,205,106; 5,284,667; 5,455,053 and 5,723,163 have similarly found wide market acceptance. Further, U.S. Patent No.
25 4,882,175 recognized the enhanced marketability of chewing gum in the form of a rolled-up tape allowing the consumer the chance to break off the desired size of piece to chew, saving the rest for later.

Another manner for increasing the novelty and play value
30 of such foods is to deposit the food onto the support material in a shape, with the support material retaining the shape of the food but with the food being peelable from the support material in a manner to increase the play value of the food item. Particularly, fruit-based snack products of
35 the type disclosed in U.S. Patent No. 5,752,364 or Appln. Nos. 08/809,537 or 08/835,895 have found market acceptance.

In addition to the form of the food item, the

-2-

1 characteristics of the food itself can add to the novelty
and play value and thus the marketability of any particular
food item. For example, in addition to the shape of the
product, coloration and other visual factors can be utilized
5 to affect the appearance of the food item. Similarly,
variations in taste between different portions of the food
in the particular food item will clearly have an impact on
marketability of the food items. However, as the food is
often desired to be fabricated as a single step for each
10 particular food item, variations in characteristics of the
food in any particular food item is difficult to fabricate,
especially when such variations are desired to be consistent
between food items.

Further, many foods are shaped and/or deposited on the
15 support material at elevated temperatures. However, it is
often desired that the particular food components include
temperature sensitive ingredients such as but not limited to
certain vitamins. It is then desired that such ingredients
be topically applied separate from the formation and deposit
20 of the food.

Accordingly, it is an object of the present invention
to provide novel apparatus and methods for the fabrication
of food items, which in the preferred form include a thin
strip of food deposited on a strip of support material.

25 Another object of the present invention is to provide
apparatus and methods where the characteristics of the food
which is continuously being deposited on a web of support
material is varied by contact with a topical application
either on the support material before the deposit of the
30 food or on the food itself after the deposit of the food.
In most preferred forms, the topical application is in the
form of a flavor which is different than the original flavor
of the food deposited on the support material. Alternately
or additionally, the topical application can include
35 temperature sensitive ingredients or fortification
ingredients which are desired to be added to the food after
its formulation.

-3-

1 Yet another object of the present invention is to
provide food items which are fabricated by such methods.

SUMMARY

Surprisingly, the above objectives can be satisfied
5 in the field of food fabrication by providing, in the
preferred form, methods of food fabrication where at least a
first topical application is provided for contact by the
food in a first portion of the area of the food so that the
food characteristics in the first portion is the combination
10 of the characteristics of the food and the topical
application. In most preferred forms, the topical
application is in the form of a first flavor which is
different than the original flavor of the food deposited on
the support material such that the resulting flavor of the
15 food in the first portion is the combination of the original
flavor of the food and the flavor of the topical
application.

The present invention will become clearer in light of
the following detailed description of illustrative
20 embodiments of this invention described in connection
with the drawings.

DESCRIPTION OF THE DRAWINGS

The illustrative embodiments may best be described by
reference to the accompanying drawings where:

25 Figure 1 shows a diagrammatic perspective view of an
apparatus utilizing food fabrication methods according to
the preferred teachings of the present invention.

Figure 2 shows a diagrammatic perspective view of an
alternate apparatus utilizing food fabrication methods
30 according to the preferred teachings of the present
invention.

All figures are drawn for ease of explanation of the
basic teachings of the present invention only; the
extensions of the Figures with respect to number,
35 position, relationship, and dimensions of the parts to
form the preferred embodiments will be explained or will
be within the skill of the art after the following

-4-

1 teachings of the present invention have been read and
understood. Further, the exact dimensions and
dimensional proportions to conform to specific force,
weight, strength, and similar requirements will likewise
5 be within the skill of the art after the following
teachings of the present invention have been read and
understood.

Where used in the various figures of the drawings,
the same numerals designate the same or similar parts.
10 Furthermore, when the terms "first", "second", "lower",
"upper", "end", "axial", "longitudinal", "width",
"height", and similar terms are used herein, it should be
understood that these terms have reference only to the
structure shown in the drawings as it would appear to a
15 person viewing the drawings and are utilized only to
facilitate describing the invention.

DESCRIPTION

Apparatus utilizing the present methods for fabricating
a food item, especially a dehydrated fruit puree, on a
20 continuous strip of support material, with the food and
support material being rolled to produce the food item,
according to the preferred teachings of the present
invention is shown in the drawings and generally designated
10. In the most preferred embodiments of the present
25 invention, apparatus 10 is an improvement of the type shown
and described in U.S. Pat. Nos. 5,205,106; 5,284,667;
5,455,053 and 5,723,163. For purpose of explanation of the
basic teachings of the present invention, the same numerals
designate the same or similar parts in the present figures
30 and the figures of U.S. Pat. Nos. 5,205,106; 5,284,667;
5,455,053 and 5,723,163. The description of the common
numerals and apparatus 10 may be found herein and in U.S.
Pat. Nos. 5,205,106; 5,284,667; 5,455,053 and 5,723,163,
which are hereby incorporated herein by reference.

35 Referring to the drawings in detail, apparatus 10
includes a strip sheeter 12 for continuously forming a
plurality of spaced, parallel, narrow strips of food 14 of a

-5-

1 thinness requiring external support upon a continuous web or
sheet of support material 16. In the preferred form where
support material 16 and food 14 supported thereon are
intended to be rolled into a coil to form a rolled food
5 item, food 14 has a thickness of about 0.035 inch (0.89mm)
whereas when food 14 is intended to be held by support
material 16 of a generally rigid material intended to support
food 14 in a generally planar condition, food 14 can have
greater thickness in the range of 0.125 to 0.25 inch (3 to 6
10 mm). In the preferred form, food 14 is formed of a base
material, gelling agents (pectin, starch, carrageenan, etc.),
and sweeteners (sucrose, corn derivatives, sugar alcohols or
other low or no calorie sweeteners). Most preferably, food
14 is a sweetened dehydrated fruit-based material typically
15 referred to in the art as a fruit leather which can be
derived from fruit purees or juices and has a water activity
("A_w") of about 0.4 to about 0.7. Similarly, food 14 can be
derived from vegetable-based materials. In the most
preferred form, food 14 is of the same type as utilized in
20 the first, solid or "hard" portion or region of the dual
textured food piece described in U.S. Patent No. 4,847,098
issued July 11, 1989 to J.E. Langler and in U.S. Patent No.
4,853,236 issued August 1, 1989 to J.E. Langler, each
entitled Dual Textured Food Piece of Enhanced Stability and
25 each of which is hereby incorporated herein by reference.

Support material 16 may be formed of any suitable,
nonedible material of a flexibility to passed through strip
sheeter 12 and which has the necessary strength to support
food 14 without tearing and which allows food 14 to be
30 easily separated therefrom for consumption. In one
preferred form, support material 16 is without bulkiness to
allow rolling of food 14 and support material 16 into a
compact food piece such as formed from silicon parchment
paper. Where food 14 is intended to be supported in a
35 generally planar condition, support material 16 can be
formed of generally rigid material such as coated
paperboard. However, support material 16 can be formed of

-6-

1 other material according to the teachings of the present
invention including but not limited to polymers such as
cellophane, glazine or wax papers, or the like.

Strip sheeter 12 generally includes first and second
5 press rollers 18 and 20. In the preferred form, roller
20 is heated by any suitable means, not shown, such as by
steam, to a temperature corresponding to the initial
temperature of food 14 and in the preferred form in the
order of 170°F (77°C). The periphery of roller 18 is
10 grooved and specifically includes a plurality of spaced,
parallel, circular, circumferential bands or lands
separating, forming and defining a plurality of spaced,
parallel, annular depressions or grooves around the
periphery of roller 18. The spacing between the lands or in
15 other words the width of the depressions or grooves is
generally equal to the desired width of the strips of food
14 and the height of the lands or in other words the depth
of the depressions or grooves is generally equal to the
desired thickness of the strips of food 14. The width of
20 the lands between depressions or grooves is generally equal
to the desired spacing between the strips of food 14 which
in the preferred form is in the order of one-eighth inch
(one-third centimeter). The bottoms of the grooves are
cylindrical in configuration and are relatively smooth.
25 Roller 20 includes a cylindrical periphery 28 which is
relatively smooth. Rollers 18 and 20 are rotatably mounted
in an abutting relation, with periphery 28 of roller 20
engaging and rolling upon the lands of roller 18 along an
abutment nip. In the most preferred form, rollers 18 and 20
30 are generally cylindrical and of equal diameters. Rollers
18 and 20 are rotated in opposite rotational directions to
define an upper, mating side 32 and a lower, exit side 34.
To allow cleaning, roller 20 may be slideably mounted
relative to roller 18 to allow separation of roller 20 from
35 roller 18.

Food 14 heated to a temperature to become flowable or
pumpable is filled into upper mating side 32, with a

-7-

1 containment bin or saddle 36 being provided complementary
to and for holding food 14 above and evenly feeding
material to and within mating side 32. In the preferred
form, bin or saddle 36 includes first and second cross
5 bars 38 extending axially across and engaging rollers 18
and 20, respectively. Bin 36 further includes end pieces
42 extending radially between and engaging the peripheries
of rollers 18 and 20 and between cross bars 38. In the
most preferred form, cross bars 38 extend generally
10 parallel to and end pieces 42 extend generally
perpendicular to the rotational axes of rollers 18 and
20. Food 14 is then pumped into bin 36 where it flows by
gravity to rollers 18 and 20. However, saddle 36 can have
other forms, including but not limited to of the
15 construction of U.S. Pat. No. 5,752,364, which is hereby
incorporated herein by reference.

Support material 16 typically is supplied from a roll
44 and after extending around the customary tension
rollers 46 is threaded to extend under cross bar 38 of
20 saddle 36 engaging roller 18, over the lands and grooves of
the periphery of roller 18 located within bin 36 and mating
side 32, and to extend between the nip of rollers 18 and 20
into exit side 34. Food 14 is initially located in mating
side 32 intermediate support material 16 and second roller
25 20. In exit side 34, support material 16 is pulled
typically by vacuum conveyors downstream from strip sheeter
12 to extend under periphery 28 of roller 20 within exit
side 34 and then extend with a small amount of tension
generally tangentially therefrom.

30 It can be appreciated that as food 14 and support
material 16 is pulled between the abutment nip between
rollers 18 and 20 by the rotation of rollers 18 and 20,
food 14 and support material 16 advancing between rollers
18 and 20 will be compressed into the grooves such that food
35 14 will be deposited in continuous, spaced, parallel,
narrow, thin strips upon support material 16, with the
number, width and height of the strips of food 14

-8-

1 corresponding to the number, width and depth of the grooves
and the spacing between the strips of food 14 corresponding
to the width of the bands or lands between the grooves.

As food 14 is hot and may have a tackiness to stick
5 or adhere to roller 20, a scraper 48 is provided to
scrape food 14 which may adhere to roller 20. In the
most preferred form, scraper 48 has a straight leading
edge which flushly engages periphery 28 of roller 20.
Scraper 48 is canted 15° to 30° from the horizontal and
10 is arranged to engage roller 20 and extend generally
tangentially therefrom at a position slightly past the
lowermost point of roller 20 on the side opposite to
roller 18. Scraper 48 in the preferred form is formed of
hardened steel which is not susceptible to wear from the
15 continuous engagement with roller 20, with roller 20 also
being heated which may soften other materials resulting
in wear. Scraper 48 further includes a thin anti-stick
coating such as Teflon®. Thus, in operation, scraper 48
mechanically scrapes any food 14 off roller 20 which is
20 then pushed onto scraper 48. Because of its non-wear
characteristics, scraper 48 can be relatively thin to
maximize removal of food 14 from and cleaning of roller
20. Further, due to its anti-stick coating, food 14
removed by scraper 48 will tend to fall by gravity when
25 it travels upon scraper 48 and specifically does not tend
to adhere or stick to scraper 48. If food 14 were to
stick to scraper 48, food 14 would tend to bunch up and
fall as the bunches grew to a size which would fall by
gravity and not remain in strips on support material 16
30 as desired in the present invention.

It can be appreciated that support material 16
separates food 14 from roller 18 and should prevent food
14 from adhering thereto. However, if a problem should
arise, such as food which could flow around the ends of
35 support material 16 or through breaks or tears in support
material 16, a suitable scraper can be provided for
roller 18 also.

-9-

1 After strip sheeter 12, the sheet of support material
16 having strips of food 14 thereon is passed through a
cooling tunnel 58. Cooling tunnel 58 is provided with
forced chilled air typically cooled to an air temperature
5 in the range of 32°-40°F (0°-4°C) and support material 16
and strips of food 14 remain in cooling tunnel 58 a
sufficient time to cool from approximately 170°F (77°C)
to 100°F (38°C). Support material 16 can be supported
within cooling tunnel 58 on a stationary platform or on a
10 moving platform such as a conveyor.

 After cooling tunnel 58, support material 16 having
strips of food 14 is passed onto a conveyor. The strips
of food 14 can then be further processed at this time at
optional stations such as by embossing or such as by
15 coloration. Thereafter, support material 16 is cut between
the strips of food 14 located thereon to form longitudinally
extending, continuous, multiple strips of support material
16 and food 14 supported thereon. Then, each of the
multiple strips of support material 16 and food 14 supported
20 thereon is cut to a finite length which in the preferred
form is generally equal to 36 inches (1 meter), with each
strip having a leading end and a trailing end. After
cutting to the finite length, the strips of support material
16 and food 14 supported thereon are rolled into a rolled
25 food item. Suitable provisions are made to prevent the
rolled food item from unrolling during fabrication such as
in the wrapping and other packaging operations. In
particular, such provisions could be the application of a
label, the use of an edible adhesive such as corn syrup, or
30 any other labelless method.

 Apparatus 10 according to the teachings of the present
invention includes suitable provisions for the topical
application of heat sensitive ingredients and most
preferably a flavoring for transfer to food 14 over time.
35 In a preferred form as shown in Figure 1, apparatus 10
includes first and second applicators 112 for applying first
and second topical applications to support material 16 prior

-10-

1 to its engagement with roller 18 of strip sheeter 12. In
the most preferred form, applicators 112 apply topical
applications in the form of a solution and are of the wiping
type. In particular, applicators 112 are of a conventional
5 design and specifically in actual practice are purchased
from May Coating Technology of White Bear Lake, Minnesota,
with modifications to correspond to the width of support
material 16 and for mounting in apparatus 10. When
applicators 112 are of the wiping type and to remove the
10 possibility of carryover, applicators 112 and support
material 16 are moved relative to each other such that
applicators 112 are spaced from support material 16 when it
is not desired to apply a topical application to support
material 16. In the most preferred form, each applicator
15 112 has associated therewith a pusher bar 114 located on the
opposite side of support material 16 than applicator 112 and
which is movable toward and away from applicator 112 such as
by an electrically actuated solenoid 116. In the form
shown, pusher bar 114 is a roller which is pressed against
20 support material 16. When moved toward applicator 112,
pusher bar 114 engages with and deflects support material 16
to engage with applicator 112 such that topical application
is wiped from applicator 112 and smeared onto support
material 16. When moved away from applicator 112, pusher
25 bar 114 does not deflect support material 16 sufficiently to
engage with applicator 112 such that topical application
will not be wiped from applicator 112 onto support material
16.

In the preferred form, neither of first and second
30 applicators 112 provide a topical application to support
material 16, or either one of the first and second
applicators 112 or both first and second applicators 112 can
provide topical application to support material 16. In the
most preferred form, topical application is supplied to
35 applicator 112 and simultaneously pusher bar 114 is moved by
solenoid 116 toward support material 16 such that support
material 16 engages with applicator 112 only when topical

-11-

1 application is desired to be topically applied by that particular applicator 112.

According to the most preferred teachings of the present invention, first applicator 112 applies a first flavor which
5 is different than the flavor of food 14 and than the second flavor which is applied by second applicator 112. In a preferred form, the first flavor is a fruit flavor including but not limited to lemon, cherry, and berry and in the most preferred form is an oil-in-water emulsion containing gum
10 arabic and xanthan as a thickener. Propylene glycol based flavors can also be used if the usage rate is low. The first flavor preferably is non-alcohol based. The first flavor has a viscosity preferably in the range of 100 to 1200 centipoise and has a usage rate in the range of
15 0.03-0.5% and preferably about 0.1% of food 14. Further, the first topical application can include a colorant having a color content of 0.0-6.0% pure dye and having a color different than the color of food 14 and preferably different than the color of the second topical application which is
20 applied by second applicator 112. Furthermore, the first topical application can include other ingredients which are desired to be provided to food 14 separate from the formation and deposit of food 14 such as vitamins, minerals (calcium, iron, magnesium, etc.), and the like fortification
25 ingredients.

In the most preferred form, second applicator 112 applies a second flavor which is different than the flavor of food 14 and than the first flavor which is applied by first applicator 112. In a preferred form, the second
30 flavor is in the form of a solution including sodium citrate, citric acid, malic acid, or other food grade acidulants, gums, and acid resistant instant starches and other thickening agents. In the most preferred form, xanthan gum is utilized, and acids are utilized in an amount
35 to reduce the pH preferably to 2.0. In the most preferred form, the second flavor has a viscosity in the range of 800 to 2200 centipoise and most preferably about 1300 centipoise

-12-

1 and has a usage rate in the range of 0.1-2.0% of food 14.
Further, the second topical application can include a
colorant having a color content of 0.0-10.0% pure dye and
having a color different than the color of food 14 and
5 preferably different than the color of the first topical
application which is applied by first applicator 112.
Furthermore, the second topical application can include
other ingredients which are desired to be provided to food
14 separate from the formation and deposit of food 14 such
10 as vitamins, minerals (calcium, iron, magnesium, etc.), and
the like fortification ingredients.

Now that the basic construction of apparatus 10
including applicators 112 has been explained, a preferred
mode of operation of apparatus 10 according to the preferred
15 teachings of the present invention can be set forth. In
particular, initially in the production cycle, pusher bars
114 for both applicators 112 are moved away from support
material 16 and flavor is not provided to either applicator
112. After support material 16 has been supplied just
20 beyond the leading end, pusher bar 114 corresponding to
second applicator 112 is moved towards applicator 112 to
engage support material 16 with second applicator 112 and
simultaneously the second flavor is supplied to second
applicator 112 so that the first flavor is topically applied
25 to support material 16. Prior to generally one third of the
finite length from the leading edge, pusher bar 114
corresponding to first applicator 112 is moved towards
applicator 112 to engage support material 16 with first
applicator 112 and simultaneously the first flavor is
30 supplied to first applicator 112 so that the second flavor
is topically applied to support material 16. Just prior to
one third of the finite length from the leading edge, pusher
bar 114 corresponding to second applicator 112 is moved
away from applicator 112 so that support material 16 does
35 not engage second applicator 112 and supply of second flavor
is interrupted to second applicator 112. It can be
appreciated that a portion of support material 16 will be

-13-

1 topically applied with both the first and second flavors,
with the portion upstream being topically applied with only
the second flavor and the portion downstream being topically
applied with only the first flavor. After first applicator
5 112 has topically applied the first flavor for about an
additional one third of the finite length and at about two
thirds of the finite length, pusher bar 114 corresponding to
first applicator 112 is moved away from applicator 112 so
that support material 16 does not engage first applicator
10 112 and supply of the first flavor is interrupted to first
applicator 112. It can then be appreciated that the portion
of support material 16 downstream of the portion which was
engaged by first applicator 112 as well as the portion of
support material upstream of the portion which was engaged
15 by applicator 112 is not topically applied with flavor.

It can be appreciated that due to the viscosity of the
topical applications, the flavors do not have a tendency to
be absorbed into support material 16 but rather have a
tendency to bead up and/or be carried by support material
20 16. As very little mixing of food 14 occurs in upper,
mating side 32 of saddle 36, flavors topically applied on
support material 16 do not have a tendency to mix with food
14 in upper mating side 32 of saddle 36 before it passes to
exit side 34 but rather tend to remain on support material
25 16 and are sandwiched against support material 16 by food 14
after passing through exit side 34. Thereafter, support
material 16 and food 14 supported thereon can be further
processed by apparatus 10. Over time, the flavor sandwiched
between support material 16 and food 14 will be absorbed or
30 otherwise transferred into food 14. Similarly, the flavor
located on support material 16 but intermediate strips of
food 14 will tend to be absorbed into food 14, can be lost
during fabrication, or can remain as residue on support
material 16.

35 Although food 14 of a single flavor is continuously
supplied to saddle 36 and continuously fabricated on support
material 16, food 14 in the rolled food item according to

-14-

1 the preferred teachings of the present invention will have
portions of different flavors as the result of the topical
application of flavors at desired portions by applicators
112. Specifically in the preferred form disclosed, as the
5 trailing edge is unrolled from the roll and food is removed
from support material 16, food 14 will have a flavor
corresponding to the flavor of food 14 entering saddle 36
for approximately the first third of the finite length.
Then in the second portion, food 14 will have a flavor
10 corresponding to the first flavor dispensed by first
applicator 112 (in combination with the flavor of food 14
entering saddle 36) for approximately the next third of the
finite length. A small transition portion is located
between the first and second portions due to transfer of
15 flavor upstream in food 14 from its application and due to
the ramp up of the application rate at initiation of
operation of first applicator 112. Generally, the last
third of the finite length, food 14 will have a flavor
corresponding to the second flavor dispensed by second
20 dispenser 112 (in combination with the flavor of food 14
entering saddle 36) for the third portion. A small
transition portion is located between the second and third
portions due to the simultaneous application of the first
and second flavors, due to the transfer of the first flavor
25 downstream and of the second flavor upstream, and the ramp
up and down of the application rates of second applicator
112 at initiation and of first applicator 112 at stopping
of operation, respectively. A small transition portion is
located downstream of the third portion due to the transfer
30 of the second flavor downstream and the ramp down of the
application rate of second applicator 112 at stopping of
operation and to insure that the second flavor is not
carried over or transferred to the next finite length beyond
the trailing end.

35 It can be appreciated that topical applications can be
provided by applicators 112 in other patterns in the
production cycle than as described. As an example, although

-15-

1 topical applications are applied once by each applicator 112
for about one third of the finite length in a production
cycle, topical applications could be applied twice by each
applicator 112 for about one sixth of the finite length each
5 time in a production cycle.

In an alternate form as shown in Figure 2, apparatus 10
includes at least a first applicator or dispenser 122 for
providing a topical application to food 14 after being
deposited on support material 16 by strip sheeter 12 and
10 preferably prior to cooling tunnel 58. In the most
preferred form, dispenser 122 provides a topical application
in the form of a dry powder and is of the metering, drop
type. In the most preferred form, the dry powder is of a
size to pass through a one twentieth of an inch (1.27 mm)
15 mesh. As food 14 is hot, food 14 has a tackiness so that
the topical application in the form of a dry powder will
tend to stick or adhere to food 14. However, to insure that
the topical application in the form of a dry powder is
suitably secured to food 14, apparatus 10 in the most
20 preferred form includes a pinch roller 124 positioned
downstream of dispenser 122 for smashing the topical
application in the form of a dry powder into food 14 but
generally without flattening food 14 below its desired
height.

25 In the most preferred form, the topical application
dispensed by dispenser 122 is a flavor such as a fruit
flavor including but not limited to lemon, punch, cherry, or
the like dried on a substrate such as gelatin or sugar by
encapsulation, spray drying, or the like. Further, the
30 topical application can include a colorant in final dry form
and which can be dry blended with the flavor. Furthermore,
the topical application can include other ingredients which
are desired to be provided to food 14 separate from the
formation and deposit of food 14 such as vitamins, minerals
35 (calcium, iron magnesium, etc.), and the like fortification
ingredients. In this regard, it is especially desirable to
topically apply temperature sensitive ingredients such as but

-16-

- 1 not limited to vitamins A and C and sweeteners such as aspartame utilizing dispenser 122 when food 14 is at a reduced temperature from when it is formulated and/or initially deposited upon support material 16.
- 5 Now that the basic construction of apparatus 10 including dispenser 122 has been explained, preferred modes of operation of apparatus 10 according to the teachings of the present invention can be set forth. In particular, initially in the production cycle, dispenser 122 is operated
- 10 just after the leading edge so that flavor is topically applied to food 14 (and smashed therein by roller 124) for slightly less than one half of the finite length from the leading edge. Thereafter, dispenser 122 is not operated so that flavor is not dispensed for approximately one half of
- 15 the finite length. It can then be appreciated that the portions of the strips of food 14 upstream and downstream of the portion in which the flavor is topically applied by dispenser 122 and is smashed into food 14 is not topically coated by flavor. In the most preferred form, dispenser
- 20 122 broadcasts the flavor over the entire width of support material 16, with any flavor which is located between the strips of food 14 and which is not smashed into or otherwise secured to food 14 can be lost during fabrication or may be captured for reuse.
- 25 In the most preferred form, the flavor smashed into food 14 will dissolve or otherwise be absorbed into food 14. However, if desired, flavor smashed into food 14 can retain its separate integrity in food 14 if consistency is not desired throughout food 14.
- 30 Multiple topical applications can be provided by including multiple dispensers 122 each supplying a separate topical application in a similar manner as applicators 112. However, as carryover is not a major concern when topical applications in the form of a dry powder are being applied,
- 35 topical applications from different sources can be supplied in a desired manner to a single dispenser 122 for immediate application to food 14.

-17-

1 Although food 14 of a single flavor is continuously
supplied to saddle 36 and continuously fabricated on support
material 16, food 14 in the rolled food item according to
the teachings of the present invention will have portions of
5 different characteristics as the result of the topical
application at desired portions by dispenser 122. In
particular and in the most preferred form, the flavor of
food 14 as it is unrolled from the roll will change
according to the whether or not a flavor has been topically
10 applied and the type and rate at which the flavor has been
topically applied.

Now that the basic teachings of the present invention
have been explained, many extensions and variations will be
obvious to one having ordinary skill in the art. For
15 example, although the methods for fabricating a food item
have been disclosed for the fabrication of a food item of a
relatively narrow width and an elongated length, the methods
according to the teachings of the present application could
have application to the fabrication of other food items.
20 Particularly, although in the preferred form strips of food
14 are deposited on support material 16 which is later cut
into multiple strips, food 14 could be deposited on support
material 16 in the form of strips. Similarly, although food
14 is deposited on support material 16 in the desired shape
25 in the preferred form by passing between rollers 18 and 20,
the food item could be deposited in other manners according
to the preferred teachings of the present invention such as
but not limited to placing food 14 upon support material 16
and then shaping food 14 on support material 16 to the
30 desired shape such as by pressing under a press roller.

Further, the methods according to the teachings of the
present invention could be utilized in the production of
food items having generally the same width and length such
as FRUIT ROLL-UPS™ fruit products.

35 Similarly, the methods according to the teachings of the
present invention could be utilized in the production of
fruit-based snack products of the type disclosed in U.S.

-18-

1 Patent No. 5,752,364 or Appln. Nos. 08/809,537 or
08/835,895, each of which are incorporated herein by
reference. In this regard, applicators 112 could topically
apply the flavors to a film material against which food 14
5 is deposited and utilized to support and remove food
material from the grooves of forming roller 18 rather than
to support material 16 extending over roller 20 as shown in
Figure 1. In this regard, transfer of the topical
applications from the film material to food 14 must occur
10 prior to its removal from food 14 and support material 16.

Likewise, although applicators 112 are shown and
described in the preferred form as being of the wiping type,
applicators 112 can be of other forms according to the
teachings of the present invention. For example,
15 applicators 112 could be of the rolling type. In this
regard, rolling type applicators 112 may have particular
advantages in applying topical applications at different
segments of their periphery without relative movement of
applicators 112 and support material 16 during topical
20 application along desired portions of support material 16.
Also, rolling type applicators 112 would have advantages of
applying flavor and similar topical applications to support
material 16 in patterns which are not necessary linear in
the direction of movement of support material 16.
25 Specifically, rolling type applicators 112 according to the
teachings of the present invention would have the ability to
apply topical applications in a printing like manner.

Furthermore, applicators 112 can be located at any
desired position upstream of strip sheeter 12. In this
30 regard, applicators 112 can be positioned such that
applicators 112 are just upstream of strip sheeter 12 so
that parts of the finite length are positioned inside strip
sheeter 12 while applicators 112 are topically applying
other parts of the finite length. On the other hand,
35 applicators 112 can be positioned considerably upstream of
strip sheeter 12 so that the topical application can dry or
partially dry upon support material 16 before reaching strip

-19-

1 sheeter 12. In this regard, provisions such as heaters,
fans, or the like can be provided to enhance drying of the
topical application on support material 16.

5 Likewise, although in the forms discussed applicators
112 and 122 are described as intermittently providing a
topical application such as to provide portions of
differing flavors in one preferred form, it can be
appreciated that applicators 112 and 122 can continuously
10 provide a topical application if desired according to the
teachings of the present invention. As an example, it would
be especially desirable to apply vitamins, minerals, and
like fortification ingredients for the entire area of food
14.

15 Furthermore, although shown as alternate embodiments,
applicators 112 and 122 can both be utilized in apparatus 10
according to the teachings of the present invention. As an
example, applicators 112 could be utilized to topically
apply a colorant and/or a flavor while applicator 122 could
be utilized to topically apply fortification ingredients.

20 Thus since the invention disclosed herein may be
embodied in other specific forms without departing from
the spirit or general characteristics thereof, some of
which forms have been indicated, the embodiments
described herein are to be considered in all respects
25 illustrative and not restrictive. The scope of the
invention is to be indicated by the appended claims,
rather than by the foregoing description, and all changes
which come within the meaning and range of equivalency of
the claims are intended to be embraced therein.

-20-

CLAIMS

1. Method comprising the steps of: providing a support material; depositing a food on the support material, with the food being easily separable from the support material for consumption, with the food having an original flavor, with the food deposited on the support material having a shape and an area; and providing at least a first topical application for contact by the food in a first portion of the area of the food, with the first topical application being in the form of a first flavor which is different than the original flavor, with the topical application being transferred to the food such that the resulting flavor of the food in the first portion is the combination of the original flavor of the food and the flavor of the topical application.

2. The method of claim 1 further comprising the step of providing a second topical application for contact by the food in a second portion of the area of the food, with the second topical application being in the form of a second flavor which is different than the original flavor and than the first flavor.

3. The method of claim 2 wherein the first and second portions are of a size less than the area, with the first and second portions overlapping on the area.

4. The method of claim 3 wherein the first and second portions include differing parts of the area.

5. The method of claim 4 wherein the area includes a third portion which does not overlap with the first and second portions and which are free of the topical application.

6. The method of claim 2 wherein the topical application providing step comprises the step of providing the topical coating on the support material before the food is deposited on the support material.

7. The method of claim 6 wherein the topical application providing step comprises the step of providing

-21-

the topical application in the form of an emulsion.

8. The method of claim 7 wherein the topical application providing step comprises the steps of: providing an applicator of the wiping type; and providing the emulsion to the applicator for smearing onto the support material.

9. The method of claim 8 wherein the support material providing step comprises the step of supplying the support material from a roll; wherein the applicator is spaced from the support material; and wherein the topical application step includes the step of deflecting the support material to engage the applicator.

10. The method of claim 9 wherein the deflecting step comprises the steps of: providing a pusher bar on the opposite side of the support material than the applicator; and moving the pusher bar toward and away from the applicator, with the support material engaging the applicator when the pusher bar is moved toward the applicator and not engaging the applicator when the pusher bar is moved away from the applicator.

11. The method of claim 6 wherein the support material providing step comprises the step of providing support material for supporting the food to form a food item.

12. The method of claim 11 wherein the support material providing step comprises the step of providing support material in the form of a paper.

13. The method of claim 12 wherein the support material providing step comprises the step of providing support material without bulkiness to allow rolling of food and support material into a coil in the food item.

14. The method of claim 1 wherein the topical application providing step comprises the step of providing the topical application on the food after the food of the shape is deposited on the support material.

15. The method of claim 14 wherein the topical application providing step comprises the step of providing

-22-

the topical application in the form of a dry powder.

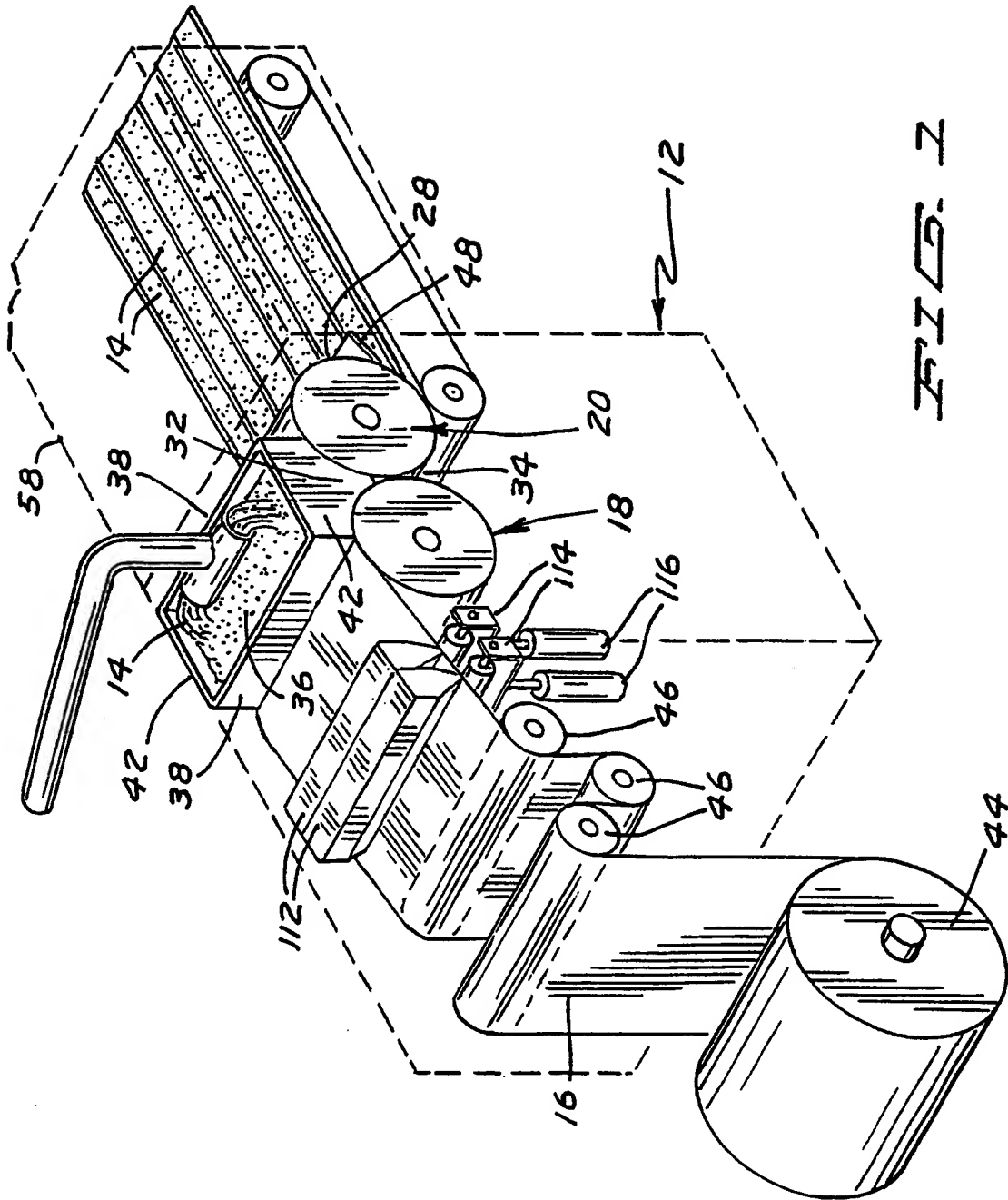
16. The method of claim 15 wherein the topical application providing step comprises the step of providing a dispenser for dispensing the dry powder on the food.

17. The method of claim 15 wherein the topical application step further comprises the step of smashing the dry powder into the food.

18. The method of claim 17 wherein the smashing step comprises the steps of providing a roller for rolling on the area of the food deposited on the support material.

19. Food item fabricated by the method of claim 1.

20. Food item comprising, in combination: a support material; a food deposited on the support material, with the food being easily separable from the support material for consumption, with the food having an original flavor, with the food deposited on the support material having a shape and an area; and a first topical application contacting the food in a first portion of the area of the food, with the first topical application being in the form of a first flavor which is different than the original flavor, with the topical application being transferred to the food such that the resulting flavor of the food in the first portion is the combination of the original flavor of the food and the flavor of the topical application.



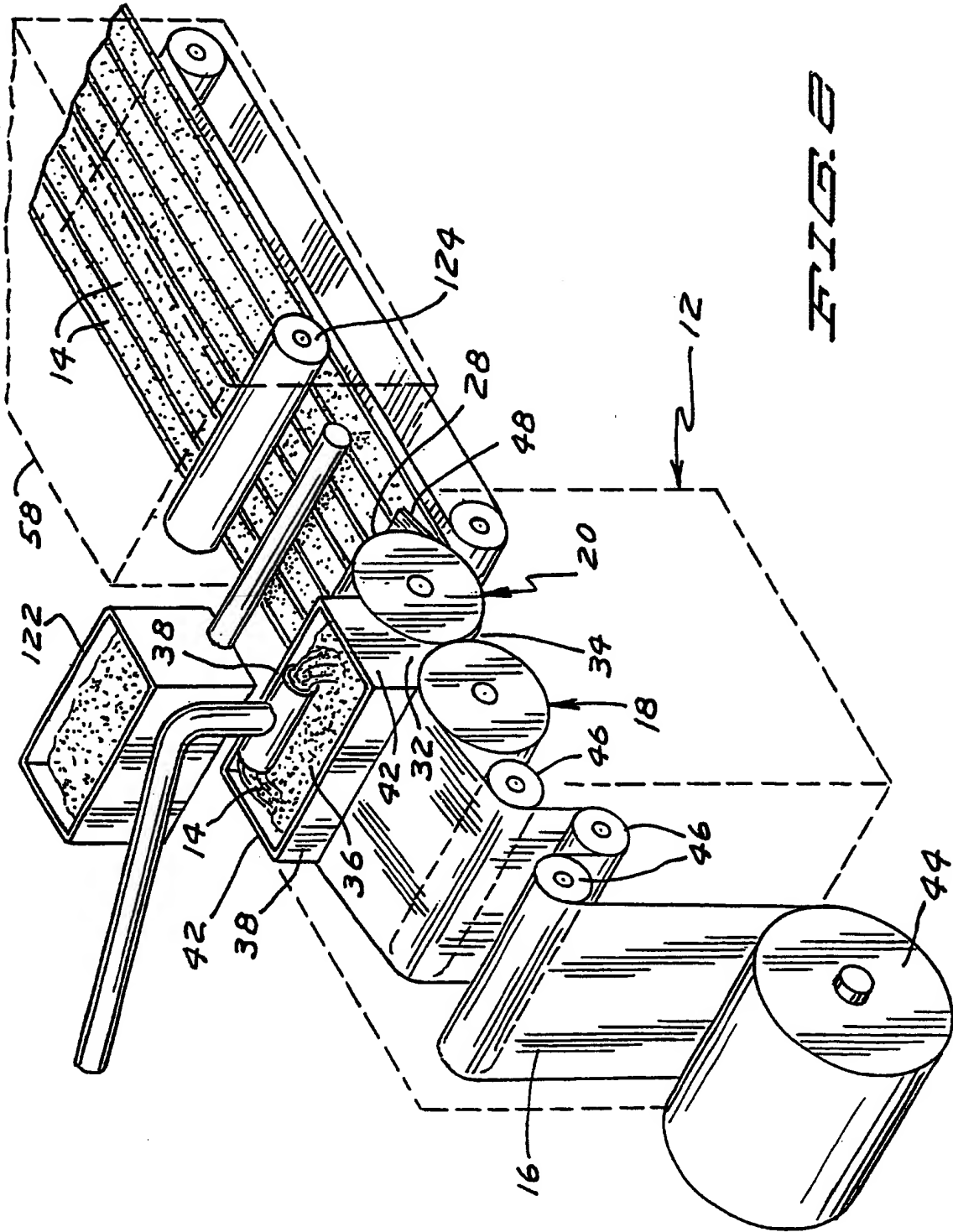


FIG. 2

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 99/14222

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 A23L1/22 A23P1/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A23L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 98 20752 A (K.H.KARLSSON) 22 May 1998 (1998-05-22) page 6, paragraph 5 -page 7, paragraph 1 page 7, paragraph 3 claims; figure ---	1,2,19, 20
A	US 4 992 284 A (G.F.KUNZ) 12 February 1991 (1991-02-12) column 2, line 38-41 claims 1,10 ---	1,2,19, 20
A	GB 2 323 262 A (FRESHERS FOODS) 23 September 1998 (1998-09-23) page 3, paragraph 3 page 4, paragraph 2 - paragraph 3 page 5, paragraph 1 claims ---	1,2,19, 20
-/-		

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

10 November 1999

Date of mailing of the international search report

18/11/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Van Moer, A

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/14222

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 205 106 A (C.E.ZIMMERMANN ET AL.) 27 April 1993 (1993-04-27) cited in the application claims; figures ---	1,2,6-20
A	US 5 752 364 A (R.O.BENHAM ET AL.) 19 May 1998 (1998-05-19) cited in the application claims; figures ---	1,2,6-20
A	US 4 847 098 A (J.E.LANGLER) 11 July 1989 (1989-07-11) cited in the application claims ---	1,2,19, 20
A	US 5 723 163 A (C.E.ZIMMERMANN ET AL.) 3 March 1998 (1998-03-03) cited in the application claims; figures ---	1,2,6-20
A	US 5 455 053 A (C.E.ZIMMERMANN ET AL.) 3 October 1995 (1995-10-03) cited in the application claims; figures ---	1,2,6-20
A	US 5 284 667 A (C.E.ZIMMERMANN ET AL.) 8 February 1994 (1994-02-08) cited in the application claims; figures -----	1,2,6-20

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PL./US 99/14222

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9820752 A	22-05-1998	AU 4873897 A	03-06-1998
US 4992284 A	12-02-1991	AU 626469 B	30-07-1992
		AU 6476790 A	02-05-1991
		CA 2025835 A	26-04-1991
		JP 3183452 A	09-08-1991
GB 2323262 A	23-09-1998	NONE	
US 5205106 A	27-04-1993	CA 2062221 C	07-03-1995
		US 5284667 A	08-02-1994
		US 5455053 A	03-10-1995
		US 5516542 A	14-05-1996
		US 5723163 A	03-03-1998
US 5752364 A	19-05-1998	US 5958485 A	28-09-1999
US 4847098 A	11-07-1989	AT 76717 T	15-06-1992
		AU 3138089 A	21-09-1989
		CA 1332306 A	11-10-1994
		EP 0333510 A	20-09-1989
		GR 3005114 T	24-05-1993
		JP 2009346 A	12-01-1990
		JP 2863928 B	03-03-1999
		KR 137774 B	25-04-1998
US 5723163 A	03-03-1998	US 5516542 A	14-05-1996
		US 5455053 A	03-10-1995
		US 5284667 A	08-02-1994
		US 5205106 A	27-04-1995
		CA 2062221 C	07-03-1994
US 5455053 A	03-10-1995	US 5284667 A	08-02-1994
		US 5205106 A	27-04-1993
		US 5516542 A	14-05-1996
		US 5723163 A	03-03-1998
		CA 2062221 C	07-03-1994
US 5284667 A	08-02-1994	US 5205106 A	27-04-1993
		US 5455053 A	03-10-1995
		US 5516542 A	14-05-1996
		US 5723163 A	03-03-1998
		CA 2062221 C	07-03-1995